Doane University

Syllabus

Course Information

Physics 107
Introductory Physics I
SUMM 2017 (May 22—July 22)
4 Credit Hours

Instructor Information

Shawn Langan
Doane University

Contact Information

Office: Available via online office hours
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Fax: Scan and email

Communicating With the Instructor

This course uses a “three before me” policy for student to faculty communications. When questions arise during the course of this class, please remember to check these three sources for an answer before asking me to reply to your individual questions:

1. Course syllabus
2. Announcements in Blackboard
3. The Q & A discussion board

This policy will help you in potentially identifying answers before I can get back to you and it also helps your instructor avoid answering similar questions or concerns multiple times.

If you cannot find an answer to your question, please first post your question to the Q & A questions discussion board. Here your question can be answered for the benefit of all students by either your fellow students who know the answer to your question or the instructor. You are encouraged to answer questions from other students in the discussion forum when you know the answer to a question in order to help provide timely assistance.

If you have questions of a personal nature such as relating a personal emergency, questioning a grade on an assignment, or something else that needs to be communicated privately, you are welcome to contact me via email or through Zoom. My preference is that you will try to email me first. I will usually respond to email from 8am to 5pm on weekdays, please allow 24 hours for me to respond.

If you have a question about the technology being used in the course, please contact the Doane University Help Desk for assistance (contact information is listed below).

Course Catalog Description

A course designed to meet the needs of the pre-professional student and the science major as well as providing an introduction to physics for all students. Topics covered include mechanics, thermodynamics, waves, and sound. Students will gain conceptual understanding and ability to use quantitative methods to model physical phenomena of the topics covered. This course includes laboratory work.

Course Big Ideas

- Physical systems and their behaviour can be modeled with graphical, mathematical, and schematic representations.
- Fundamental physics principles model the motion, force, and energy of physical systems.
- All forms of matter have unique physical properties, which allow for the characterization of its behavior.

Recommended Prerequisites

Doane Core Math Skills: Algebra, Trigonometry and Geometry

Course Textbook and Materials

Required

Modified MasteringPhysics with **eText** – Instant Access – for College Physics: A Strategic Approach, 3rd Edition

Knight, Jones & Field

©2015 | Electronic Package | ISBN-13: 9780321943781

Online purchase price: $115.95

Optional

You must purchase access to mastering physics, but you are welcome to purchase the hard copy textbook:

College Physics: A Strategic Approach Technology Update, 3rd Edition

Knight, Jones & Field

ISBN-13: 978-0134167831

ISBN-10: 013416783X

Learning Objectives

Course Objectives

At the completion of this course students will be able to:

1. Define the relationship between position, velocity and acceleration (kinematic variables) and apply to point masses.

2. Analyze and predict the motion of a projectile

3. Define Newton's Laws of motion and apply them to forces on point masses

4. Define the relationship between rotational position, velocity, and acceleration and apply these to point masses

5. Apply Newton's Laws of motion as they relate to the rotational forces on rigid bodies

6. Apply conservation of energy and energy of motion/position to physical systems

7. Define matter, the states of matter, and their physical characteristics

8. Define and depict fluids and utilize fundamental physical laws to predict fluid flow patterns

Module Objectives

Module I:

a. Express physical quantities as a scalar or vector, in proper notation, and with proper units.
b. Define a point mass and kinematic variables (position, velocity, and acceleration) in mathematical and graphical form
c. Define the relationship between the kinematic variables in mathematical and graphical form
d. Define and use vector addition in graphical form
e. Use the various forms of the kinematic variables to predict the behavior of a point mass at any given time.

Module II:

a. Define constant velocity and constant acceleration and characterize their distinguishing features in graphical and mathematical form
b. Define geometric and trigonometric functions that allow for the separation of a vector into components
c. Use these mathematical functions to separate position, velocity, and acceleration vectors into components
d. Use the expressions for constant velocity and the mathematical functions to predict the behavior of a point mass at any time.
e. Use the expressions for constant acceleration and constant velocity to predict the behavior of a projectile at any time.

Module III:

a. Define forces, including normal, frictional, applied forces, and the force of gravity
b. Define Newton's Laws of Motion and give examples of their application
c. Use Newton's second law of motion to predict a resultant force vector
d. Apply the sum of all forces on an object to predict the object's acceleration
e. Use a combination of Newton's laws and the kinematic equations to predict the motion of a point mass experiencing multiple forces

Module IV:

a. Define the rotational kinematic variables of angular position, velocity, acceleration
b. Relate the rotational kinematic variables to translational kinematic variables
c. Use the relationships between rotational kinematic variables in graphical and mathematical to analyze point masses
d. Use the rotational kinematic equations to predict the behaviour of point masses at any time
e. Provide examples of rotational kinematics to the motion of the human body

Module V:

a. Define the center of mass, moment of inertia, and torque
b. Define newton's second law of motion in terms of rigid bodies
c. Predict the rotational variables of rigid bodies using these definitions
d. Define a static rigid body
e. Predict the normal forces on static rigid bodies given several torques

Module VI:

a. Define momentum, impulse, and angular momentum
b. Apply the conservation of momentum to elastic and inelastic collisions
c. Define conservative forces, kinetic energy, and potential energy
d. Define conservation of work/energy theorem
e. Apply the conservation of energy to predict the kinematic variables of point masses and rigid bodies

Module VII:

a. Define three states of matter and their physical characteristics
b. Define heat, methods of heat transfer, and the first law of thermodynamics.
c. Define phase changes and specific heat
d. Use the first law of thermodynamics to predict the behaviour of matter in a calorimeter
e. Define and use the ideal gas law to predict the behavior of a gas

Module VIII:

a. Define a fluid and depict its atomic structure
b. Define Archimedes' principle and use it to predict the behavior of solid masses in fluids
c. Define and utilize the equation of continuity to predict flow rates of fluids
d. Define Bernoulli's principle and predict when it is applicable and when it is not
e. Use Bernoulli's principle to solve for the physical characteristics of a fluid experiencing a gravitational force

Course Requirements

Online Course

This is an online course and therefore there will not be any face-to-face class sessions. All assignments and course interactions will utilize internet-based technologies.

Attendance Policy

You should plan to work on this course everyday. This means that you must have a reliable and consistent internet connection throughout the duration of the course. It is strongly recommended that you not take any vacations during this course. This is a condensed, fast-paced course and it would be extremely difficult to catch up after a prolonged absence.

Course Preparation and Participation

Preparation for class means reading the assigned readings & reviewing all information required for that week. *Attendance* in an online course means logging into the Blackboard and on a regular basis and *participating* in the all of activities that are posted in the course.

Studying and Preparation Time

The course requires you to spend time preparing and completing assignments. A three-credit course requires 144 hours of student work. Therefore expect to spend approximately 18 hours a week preparing for and actively participating in this 8-week course.

Computer Requirements

This course requires that you have access to a computer that can access the internet. You will need to have access to, and be able to use, the following software packages:

- A web browser (Chrome or Mozilla Firefox)
- Adobe Acrobat Reader
- Adobe Flash Player
- Google Docs or other word-processing software
- Java

These programs are free and fairly easy to install. Your instructor can help you with basic questions regarding these items. You are responsible for having a reliable computer and internet connection throughout the course.

Email and Internet

You must have an active Doane University e-mail account and access to the Internet. *All instructor correspondence will be sent to your Doane* University *e-mail account.* Please plan on checking your Doane Gmail account regularly for course related messages.

This course uses Blackboard for the facilitation of communications between faculty and students, submission of assignments, and posting of grades. The Blackboard Course Site can be accessed at http://bb2.doane.edu

Campus Network or Blackboard Outage

When access to Blackboard is not available for an extended period of time (greater than one entire evening - 6pm till 11pm) you can reasonably expect that the due date for assignments will be changed to the next day (assignment still due by midnight).

Late or Missed Assignments
ALL assignments must be finished and turned in to complete the course. Unless the instructor is notified BEFORE the assignment is due and he or she provides an opportunity for the student to submit a assignment late, points may be taken off for a late assignment.

Late Policy:
Online Lecture Questions: Each online lecture will have several questions which must be answered while listening to the online lecture. The answers to these questions are submitted in Blackboard before 11:59p.m. each weekday. For every day past the deadline these questions are not completed, you will receive a **10% deduction** from the Lecture Questions assignment that is late.
Q & A – You will be required to post one answer or question to the Q & A discussion board each Wednesday, before 11:59p.m. Each Q & A question is worth 1% of your final grade. If you are late with this portion of your assignment, then you will forfeit that 1%.
Homework – Homework assignments will be due EVERY weekday by 11:59p.m. If you are late with a homework assignment, you will receive a 10% deduction on the late assignment, for each day that it is past the deadline.
Labs – Lab reports are due by 11:59p.m. each Thursday. If you are late turning in a lab report or completing the Late Nite Lab activities, then you will receive a 10% reduction in the grade for that lab, for each day past the deadline, until it is completed.
Weekly Quiz – You will have a quiz over every weekend, due before 11:59p.m. each Sunday. If you are late on the quiz, you will receive a 10% reduction in the grade for that quiz for each day past the deadline.

Submitting Assignments
All assignments, unless otherwise announced by the instructor, must be submitted via Blackboard. Each assignment will have a designated place for submission.

Drop and Add dates
If you feel it is necessary to withdraw from the course, please contact your advisor for full details on the types of withdrawals that are available and their procedures.

Subject to change notice
All material, assignments, and deadlines are subject to change with prior notice. It is your responsibility to stay in touch with your instructor, review the course site regularly, or communicate with other students, to adjust as needed if assignments or due dates change.

Academic Integrity
Doane University expects and requires all its students to act with honesty and integrity, and respect the rights of others in carrying out all academic assignments. Academic dishonesty, the act of knowingly and willingly attempting or assisting others to gain academic success by dishonest means, is manifested in various measures. Gehring, et al, (1986) suggests that four categories of academic dishonesty exist[1]:

a. Cheating
b. Fabrication
c. Facilitating academic dishonesty
d. Plagiarism

For more information on academic integrity, please visit the website:
http://catalog.doane.edu/content.php?catoid=4&navoid=191

Course Grading

Grades and Grading Scale
Assignment of letter grades is based on a percentage of points earned. The letter grade will correspond with the following percentages achieved. All course requirements must be completed before a grade is assigned.

A	100 – 90
B	89 – 80
C	79 – 70
D	69 – 60
E	59 and below

See the requirements for the specific Assignments on Blackboard.

How to Succeed in this Course

- Check your Doane email regularly
- Log in to the course web site daily
- Communicate with your instructor
- Create a study schedule so that you don't fall behind on assignments

Accessibility Statement

In compliance with the Rehabilitation Act of 1973, Section 504, and the Americans with Disabilities Act of 1990, professional disability specialists and support staff at Doane University facilitate a comprehensive range of academic support services and accommodations for qualified students with disabilities. Doane University staff coordinate transition from high schools and community colleges, in-service training for faculty and staff, resolution of accessibility issues, community outreach, and collaboration between all Doane University regarding disability policies, procedures, and accommodations.

Student Conduct Statement

Students are required to adhere to the behavior standards listed in **Doane University Policy Manual**

Appropriate classroom behavior is defined by the instructor. This includes the number and length of individual messages online. Course discussion messages should remain focused on the assigned discussion topics. Students must maintain a cordial atmosphere and use tact in expressing differences of opinion. Inappropriate discussion board messages may be deleted if an instructor feels it is necessary. Students will be notified privately that their posting was inappropriate.

Student access to the course Send Email feature may be limited or removed if an instructor feels that students are sending inappropriate electronic messages to other students in the course.

Technical Support Contact Information

For technical assistance 24 hours a day, 7 days a week, please contact the Doane University Technology Office Help Desk:

Phone: 402-826-8411
Email: helpdesk@doane.edu
Web: http://www.doane.edu

Syllabus Disclaimer

The instructor views the course syllabus as an educational contract between the instructor and students. Every effort will be made to avoid changing the course schedule but the possibility exists that unforeseen events will make syllabus changes necessary. The instructor reserves the right to make changes to the syllabus as deemed necessary. Students will be notified in a timely manner of any syllabus changes face-to-face, via email or in the course site Announcements. Please remember to check your Doane University email and the course site Announcements often.